

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (PREVIOUSLY PRESENTED) An electrical interconnection system comprising:

a rotary transformer for coupling to a first electrical system and to a second electrical system, the rotary transformer comprising:

a rotor connected to the first electrical system;

a stator connected to the second electrical system;

a controller which adjusts an angular position of the rotary transformer, the controller comprising:

a first control unit which compares an input order power signal P_o to a measured power signal P_l being transferred between the first electrical system and the second electrical system to generate a requested angular velocity signal ω_o ;

a second control unit which compares the requested angular velocity signal ω_o to a measured angular velocity signal ω_r of the rotary transformer to generate a drive signal T_o .

2. (ORIGINAL) The system of claim 1, wherein the controller adjusts an angular position of the rotary transformer so that a predetermined power is transferred from the first electrical system to the second electrical system.

3. (CANCELED)

4. (ORIGINAL) The system of claim 1, wherein the controller has a bandwidth chosen to dampen inherent oscillations in the interconnection system.

5. (ORIGINAL) The system of claim 1, wherein the first electrical system and the second electrical system are a respective first electrical utility company and a second electric utility company.

6. (PREVIOUSLY PRESENTED) The system of claim 1, wherein the interconnection system further comprises a torque control unit for rotating the rotor.

7. (ORIGINAL) The system of claim 6, wherein the controller controls the torque control unit whereby the rotor is rotated at a variable speed.

8. (ORIGINAL) The system of claim 7, wherein the controller controls the torque control unit whereby the rotor is bi-directionally rotated at a variable speed.

9. (CANCELLED)

10. (CANCELLED)

11. (CANCELLED)

12. (CANCELLED)

13. (CANCELLED)

14. (CANCELLED)

15. (PREVIOUSLY PRESENTED) A substation for electrically interconnecting a first electrical system and to a second electrical system, the first electrical system and the

second electrical system having a differing electrical characteristic, the substation comprising:

- a step-down transformer coupled to the first electrical system;
- a step-up transformer coupled to the second electrical system;
- a rotary transformer coupled to the step-down transformer and to the step-up transformer, the rotary transformer comprising:
 - a rotor connected to a first of the step-down and step-up transformers;
 - a stator connected to a second of the step-down and step-up transformers;
 - a controller which adjusts an angular position of the rotary transformer so that a predetermined power is transferred from the first electrical system to the second electrical system, the controller comprising:
 - a first control unit which compares an input order power signal P_o to a measured power signal P_i being transferred between the first electrical system and the second electrical system to generate a requested angular velocity signal ω_o ;
 - a second control unit which compares the requested angular velocity signal ω_o to a measured angular velocity signal ω_r of the rotary transformer to generate a drive signal T_o .

16. (ORIGINAL) The system of claim 15, wherein the controller bi-directionally operates the rotary transformer at a variable speed for transferring power from the first electrical system to the second electrical system.

17. (ORIGINAL) The system of claim 15, wherein the rotary transformer comprises:

- a rotor connected to a first of the step-down and step-up transformers;
- a stator connected to a second of the step-down and step-up transformers;

and wherein the interconnection system further comprises an torque control unit for rotating the rotor.

18. (ORIGINAL) The system of claim 17, wherein the controller controls the torque control unit whereby the rotor is rotated at a variable speed.

19. (CANCELLED)

20. (CANCELLED)

21. (CANCELLED)

22. (CANCELLED)

23. (CANCELLED)

24.. (ORIGINAL) The system of claim 15, wherein the controller has a bandwidth chosen to dampen inherent oscillations in the interconnection system.

25. (Currently Amended) An electrical interconnection system comprising:

a rotary transformer for coupling to a first electrical system and to a second electrical system, the rotary transformer comprising:

a rotor connected to the first electrical system;

a stator connected to the second electrical system;

a closed loop angular positioning control system which operates the rotary transformer for transferring power from the first electrical system to the second electrical system in response to a comparison between an input order power signal P_o and a measured power signal P_1 being transferred between the first electrical system and the second electrical system.

26. (ORIGINAL) The system of claim 25, wherein the controller has a bandwidth chosen to dampen inherent oscillations in the interconnection system.

27. (Currently Amended) A method of interconnecting two electrical systems, the method comprising:

coupling a rotor of a rotary transformer to a first electrical system and a stator of the rotary transformer to a second electrical system;

comparing an input order power signal P_o and a measured power signal P_l being transferred between the first electrical system and the second electrical system to generate a requested angular velocity signal ω_o ; and

adjusting an angular position of the rotary transformer so that a predetermined power is transferred from the first electrical system to the second electrical system, the adjusting being performed by a closed loop angular positioning control system which operates the rotary transformer for transferring power from the first electrical system to the second electrical system.

28. (ORIGINAL) The method of claim 27, further comprising:

~~comparing an input order power signal P_o to a measured power signal P_l being transferred between the first electrical system and the second electrical system to generate a requested angular velocity signal ω_o ;~~

comparing the requested angular velocity signal ω_o to a measured angular velocity signal ω_r of the rotary transformer to generate a drive signal T_o .